CLAIMS

What is claimed is:

1. An organic electroluminescence (EL) display device assembly comprising:

a substrate;

an organic EL portion having a first electrode layer, an organic luminescent layer, and a second electrode layer, which are each patterned and stacked proximate to an upper surface of the substrate; and

an optical loss prevention layer to increase light bleeding efficiency,

wherein a fine space layer is formed between the optical loss prevention layer and the organic EL portion layer and is filled with a gas or evacuated.

2. The organic EL display device assembly of claim 1, wherein the optical loss prevention layer is a diffraction grating having a plurality of protrusions formed on the upper surface of the substrate with a predetermined pitch between adjacent protrusions.

3. The organic EL display device assembly of claim 2, wherein the protrusions contact the second electrode layer.

4. The organic EL display device assembly of claim 2, wherein the pitch between adjacent protrusions is 200 nm to 2000 nm.

5. The organic EL display device assembly of claim 4, wherein the height of each of the protrusions is 50 nm to 5000 nm.

6. The organic EL display device assembly of claim 1, wherein the second electrode layer is formed of indium tin oxide (ITO).

7. The organic EL display device assembly of claim 1, wherein the optical loss prevention layer is formed of at least one material selected from the group consisting of $SiO_x(x>1)$, SiN_x, Si_3N_4, TiO_2, MgO, ZnO, Al_2O_3, SnO_2, In_2O_3, MgF_2, and CaF_2.

8. The organic EL display device assembly of claim 7, wherein the optical loss prevention layer is formed of TiO_2.

9. The organic EL display device assembly of claim 1, further comprising an index layer with a substantial refractive index formed between the fine space layer and the second electrode layer.

10. The organic EL display device assembly of claim 9, wherein the index layer is formed of TiO_2.

11. The organic EL display device assembly of claim 9, wherein the refractive index of the index layer is greater than or equal to 2.3.

12. The organic EL display device assembly of claim 9, wherein the thickness of the index layer is greater than or equal to 2000 nm.

13. An organic EL display device assembly comprising:

a substrate;

an organic EL display portion having a first electrode layer, an organic luminescent layer, and a second electrode layer, which are each patterned and stacked on an upper surface of the substrate; and

a photonic plate which forms a fine space layer by combining with the organic EL display portion and has an optical loss prevention layer.

14. The organic EL display device assembly of claim 13, wherein the optical loss prevention layer of the photonic plate has a plurality of protrusions formed on the upper surface of the substrate with a predetermined pitch between adjacent protrusions.

15. The organic EL display device assembly of claim 14, wherein the protrusions contact the second electrode layer.

16. The organic EL display device assembly of claim 14, wherein the pitch between adjacent protrusions is 200 nm to 2000 nm.

17. The organic EL display device assembly of claim 14, wherein the height of each of the protrusions is 50 nm to 5000 nm.

18. The organic EL display device assembly of claim 1, wherein the diffraction grating is formed of at least one material selected from the group consisting of SiO_x (x>1), SiN_x, Si_3N_4, TiO_2, MgO, ZnO, Al_2O_3, SnO_2, In_2O_3, MgF_2, and CaF_2.

19. The organic EL display device assembly of claim 18, wherein the optical loss prevention layer is formed of TiO_2.

20. The organic EL display device assembly of claim 13, further comprising an index layer with a substantial refractive index formed between the fine space layer and the first electrode layer.

21. The organic EL display device assembly of claim 9, wherein the refractive index of the index layer is greater than or equal to 2.3.

22. An organic EL display device assembly comprising:

a substrate;

a pixel portion having a first electrode layer patterned on the substrate, an organic luminescent layer patterned on an upper surface of the first electrode layer, an insulating layer formed on an upper surface of the substrate to expose an organic luminescent layer, and a second electrode layer which is transparent and patterned on an upper surface of the organic luminescent layer and an upper surface of the insulating layer;

a driving portion formed on the substrate and having thin film transistors to switch the first electrode layer; and

a photonic plate formed on the upper surface of the first electrode layer, forming a fine space layer filled with an inert gas or evacuated, and having an optical loss prevention layer.

23. The organic EL display device assembly of claim 22, further comprising a planarization film formed on the upper surface of the first electrode layer.

24. The organic EL display device assembly of claim 22, wherein the optical loss prevention layer of the photonic plate has a plurality of protrusions formed on the upper surface of the substrate with a predetermined pitch between adjacent protrusions.

25. The organic EL display device assembly of claim 22, wherein the protrusions contact the second electrode layer.

26. The organic EL display device assembly of claim 24, wherein the pitch between adjacent protrusions is 200 nm to 2000 nm.

27. The organic EL display device assembly of claim 24, wherein the height of each of the protrusions is 50 nm to 5000 nm.

28. The organic EL display device assembly of claim 23, wherein the diffraction grating is formed of at least one material selected from the group consisting of SiO_x (x>1), SiN_x, Si_3N_4, TiO_2, MgO, ZnO, Al_2O_3, SnO_2, In_2O_3, MgF_2, and CaF_2.

29. The organic EL display device assembly of claim 23, further comprising an index layer with a substantial refractive index formed between the fine space layer and the second electrode layer.

30. The organic EL display device assembly of claim 20, wherein the refractive index of the index layer is greater than or equal to 2.3.

31. An organic EL display device assembly comprising:

a substrate;

a first electrode layer, an organic luminescent layer, and a second electrode layer sequentially stacked proximate to an upper surface of the substrate; and

an optical loss prevention layer having a substantially different refractive index from a refractive index among the first electrode layer, the organic luminescent layer, and the second electrode layer, and being formed between the first electrode layer and the substrate,

wherein a fine space layer is formed between the optical loss prevention layer and the first electrode layer and is filled with a gas or evacuated.

32. The organic EL display device assembly of claim 31, wherein the optical loss prevention layer is a patterned thin film .

33. The organic EL display device assembly of claim 31, wherein the optical loss prevention layer comprises at least two area groups having different refractive indices, and a pitch between adjacent areas in one of the two area groups with different refractive indices of the optical loss prevention layer is 50 nm to 3000 nm.

34. The organic EL display device assembly of claim 3, wherein the thickness of the optical loss prevention layer is 0.01 μm to 50 μm.

35. The organic EL display device assembly of claim 31, wherein the optical loss prevention layer is formed of inorganic materials with refractive indices that differ by an amount in a range of 0.3 to 3.

36. The organic EL display device assembly of claim 35, wherein the inorganic materials are at least two materials selected from the group consisting of SiO_x (x>1), SiN_x, Si_3N_4, TiO_2, MgO, ZnO, Al_2O_3, SnO_2, In_2O_3, MgF_2, and CaF_2.

37. The organic EL display device assembly of claim 1, wherein the optical loss prevention layer is formed of SiO_x (x>1) and TiO_2 which have different refractive indices.

38. An organic EL display device assembly comprising:

a substrate;

a pixel portion having a first electrode layer patterned on the substrate, an organic luminescent layer patterned on an upper surface of the first electrode layer, an insulating layer formed on an upper surface of the substrate to expose an organic luminescent layer, and a second electrode layer which is transparent and patterned on an upper surface of the organic luminescent layer and an upper surface of the insulating layer;

a driving portion formed on the substrate and having thin film transistors to switch the first electrode layer;

a planarization film formed on the upper surface of the second electrode layer; and

a photonic plate which forms a fine space layer filled with an inert gas or evacuated by combination with the planarization film and has an optical loss prevention layer having patterned areas with different refractive indices.

39. The organic EL display device assembly of claim 38, wherein a pitch of one of the two patterned areas with different refractive indices of the optical loss prevention layer is 50 nm to 3000 nm.

40. The organic EL display device assembly of claim 38, further comprising an index layer with a substantial refractive index formed between the fine space layer and the first electrode layer.

41. The organic EL display device assembly of claim 40, wherein the refractive index of the index layer is greater than or equal to 2.3.

42. The organic EL display device assembly of claim 40, wherein the planarization film is formed on the upper surface of the first electrode layer.

43. The organic EL display device assembly of claim 32, wherein the pitch between adjacent areas in one of the two area groups with different refractive indices of the optical loss prevention layer is 50 nm to 3000 nm.

44. The organic electroluminescence (EL) display device assembly of claim 1, wherein the optical loss prevention layer comprises a patterned thin film having at least two materials with different refractive indices.

45. An organic electroluminescence (EL) display device assembly comprising:

a substrate;

an organic EL portion having a first electrode layer, an organic luminescent layer, a second electrode layer, which are each patterned and stacked on an upper surface of the substrate;

a first photonic plate disposed on the organic EL portion;

a second photonic plate disposed proximate to the first photonic plate;

an optical loss prevention layer, disposed on the second photonic plate and facing the first photonic plate, to increase light bleeding efficiency,

wherein a fine space layer is formed between the optical loss prevention layer and the optical loss prevention layer and is filled with a gas or evacuated.

46. The organic EL display device assembly of claim 8, wherein the optical loss prevention layer is formed of SiO_x (x>1) and TiO_2 which have different refractive indices.